

WHAT IS CLAIMED IS:

1           1.     A peristaltic pump comprising:  
2                     occluding surfaces rotatably supported about a common axis by a  
3     support;  
4                     a first occlusion having a first occlusion surface, wherein at least  
5     one of the support and the first occlusion is movable towards the other of the  
6     support and the first occlusion; and  
7                     a drive system configured to rotate the occluding surfaces and  
8     coupled to at least one of the support and the first occlusion so as to move at  
9     least one of the support and the first occlusion.

1           2.     The pump of Claim 1, wherein the drive system is coupled to the  
2     first occlusion to move the first occlusion surface relative to the occluding  
3     surfaces.

1           3.     The pump of Claim 2 including a first pivotable arm having a first  
2     portion coupled to the drive system and a second portion operably coupled to  
3     the occlusion surface.

1           4.     The pump of Claim 3 including a second pivotable arm having a  
2     first portion coupled to the drive system and a second portion operably coupled  
3     to the first occlusion.

1           5.     The pump of Claim 2 including a pumping tube, wherein the first  
2     occlusion is resiliently biased towards one of a pumping position in which the  
3     occluding surfaces compress the pumping tube against the first occlusion  
4     surface and a non-pumping position.

1           6.     The pump of Claim 5, wherein the first occlusion is resiliently  
2     biased towards the non-pumping position.

1           7.     The pump of Claim 2, wherein the drive system includes:

2                   a motor having an output shaft, wherein the motor is movably  
3 supported; and  
4                   a drive train coupled between the output shaft and the occluding  
5 surface, wherein the motor is operably linked to the first occlusion and wherein  
6 movement of the motor moves the first occlusion relative to the first occluding  
7 surface.

1           8.     The pump of Claim 7, wherein the motor is linearly movable.

1           9.     The pump of Claim 7, wherein the motor pivots.

1           10.    The pump of Claim 7, wherein the motor is resiliently biased  
2 towards a pre-selected position.

1           11.    The pump of Claim 10, wherein the motor is resiliently biased  
2 towards the position such that the first occlusion surface is spaced from the  
3 occluding surfaces by a distance greater than the diameter of the pumping tube.

1           12.    The pump of Claim 7 including at least one bias mechanism  
2 coupled to the motor to resiliently bias the motor towards a preselected  
3 position.

1           13.    The pump of Claim 7 including a first stop surface configured to  
2 limit travel of the motor in a first direction.

1           14.    The pump of Claim 13 including a second stop surface configured  
2 to limit travel of the motor in a second opposite direction.

1           15.    The pump of Claim 7, wherein the drive train includes:  
2                   a worm gear; and  
3                   a worm in engagement with the worm gear.

1           16.    The pump of Claim 7, wherein the drive train includes:  
2                   a first spur gear; and

3           a second spur gear in engagement with the first spur gear, wherein  
4   the pump further includes a linkage pivotably supporting the motor relative to  
5   the first spur gear.

1           17.   The pump of Claim 7 including a first pivotable arm having a first  
2   portion operably linked to the motor and a second portion, wherein movement of  
3   the motor in a first direction pivots the second portion into engagement with the  
4   first occlusion.

1           18.   The pump of Claim 17 including a second pivotable arm having a  
2   third portion operably linked to the motor and a fourth portion, wherein  
3   movement of the motor in a second opposite direction pivots the fourth portion  
4   into engagement with the first occlusion.

1           19.   The pump of Claim 7, wherein the motor is stationarily coupled to  
2   the first occlusion such that the motor and the first occlusion move together.

1           20.   The pump of Claim 19 including a second occlusion having a  
2   second occlusion surface, wherein the second occlusion is stationarily coupled  
3   to the motor such that the motor and the second occlusion move together.

1           21.   The pump of Claim 20, wherein the first occlusion surface and the  
2   second occlusion surface face one another.

1           22.   The pump of Claim 1, wherein the drive system is coupled to the  
2   support to move the support relative to the first occlusion.

1           23.   The pump of Claim 22 including a platform supporting the drive  
2   system and the support, wherein the platform is movably supported relative to  
3   the first occlusion and wherein the drive system is operably coupled to the  
4   platform so as to move the platform.

1           24.   The pump of Claim 23, wherein the drive system includes:  
2               a motor having an output shaft, wherein the motor is movably  
3   supported relative to the platform; and

4 a drive train coupled between the output shaft and the occluding  
5 surface, wherein the motor is operably linked to the platform and wherein  
6 movement of the motor moves the platform and the support.

1 25. The pump of Claim 24, wherein the motor is resiliently biased  
2 towards a pre-selected position.

1 26. The pump of Claim 25, wherein the motor is resiliently biased  
2 towards the position such that the occlusion surface is spaced from the  
3 occluding surfaces by a distance greater than the diameter of the pumping tube.

1 27. The pump of Claim 24 including a first stop surface configured to  
2 limit travel of the motor in a first direction.

1 28. The pump of Claim 27 including a second stop surface configured  
2 to limit travel of the motor in a second opposite direction.

1 29. The pump of Claim 24, wherein the drive train includes:  
2 a worm gear; and  
3 a worm in engagement with the worm gear.

1 30. The pump of Claim 24 including a first pivotable arm having a first  
2 portion operably linked to the motor and a second portion, wherein movement of  
3 the motor in a first direction pivots the second portion into engagement with the  
4 platform.

1 31. The pump of Claim 30 including a second pivotable arm having a  
2 third portion operably linked to the motor and a fourth portion, wherein  
3 movement of the motor in a second opposite direction pivots the fourth portion  
4 into engagement with the platform.

1 32. The pump of Claim 1 including at least one bias mechanism  
2 coupled to said at least one of the support and the first occlusion to resiliently  
3 bias said one of the support and the first occlusion towards a non-pumping  
4 position.

1           33. The pump of Claim 1, wherein the drive system is configured to  
2 move at least one of the support and the first occlusion from a non-pumping  
3 position towards a pumping position when the occluding surfaces are rotated  
4 about the common axis in a first direction and wherein the drive system is  
5 configured to move at least one of the support and the first occlusion from the  
6 non-pumping position to the pumping position during rotation of the occluding  
7 surfaces about the common axis in a second opposite direction.

1           34. An image-forming device comprising:  
2                 an ink reservoir;  
3                 an ink dispensing device configured to dispense ink upon a medium;  
4 and  
5                 a peristaltic pump including:  
6                         a pumping tube in fluid communication with the ink reservoir  
7 and the ink dispensing device;  
8                         occluding surfaces rotatably supported about a common axis  
9 by a support on a first side of the pumping tube;  
10                        an occlusion having an occlusion surface on a second side of  
11 the pumping tube, wherein at least one of the occlusion surface and the support  
12 is movable towards the other of the first occlusion surface and the support; and  
13                        a drive system configured to rotate the occluding surfaces  
14 and coupled to at least one of the first occlusion surface and the support so as  
15 to move at least one of the first occlusion surface and the support.

1           35. A peristaltic pump comprising:  
2                 a fluid passage having a compressible portion;  
3                 occluding surfaces rotatably supported about a common axis by a  
4 support on a first side of the compressible portion of the fluid passage;  
5                 an occlusion surface on a second opposite side of the compressible  
6 portion of the fluid passage;  
7                 a rotary actuator; and

8 means for operably connecting the rotary actuator to at least one  
9 of the support and the occlusion surface such that the rotary actuator  
10 simultaneously rotates the occluding surfaces and moves at least one of the  
11 support and the occlusion surface towards and away from one another between  
12 a tube compressing state and a tube uncompressed state.

1 36. The pump of Claim 35 including means for operably linking the  
2 rotary actuator to at least one of the occluding surfaces and the occlusion  
3 surface such that rotation of the occluding surfaces in a first direction  
4 simultaneously moves at least one of the support and the occlusion surface  
5 towards a tube compressing state and such that rotation of the occluding  
6 surfaces in a second opposite direction simultaneously moves at least one of the  
7 support and the occlusion surface towards the tube compressing state.

1 37. A method for pumping fluid through a tube, the method comprising:  
2 generating a torque;  
3 transmitting the torque to occluding surfaces to rotate the  
4 occluding surfaces relative to a support about a common axis;  
5 transmitting the torque to at least one of the support and an  
6 occlusion surface to move at least one of the support and the occlusion surface  
7 towards and away from one another between a tube compressing state in which  
8 the tube is compressed between the occluding surfaces and the occlusion  
9 surface and a tube uncompressed state.

1 38. The method of claim 36 further comprising converting the torque to  
2 a linear force to move at least one of the support and the occlusion surface  
3 relative to one another between the tube compressing state in which the tube is  
4 compressed between the occluding surfaces and the occlusion surface and the  
5 tube uncompressed state.

1 39. A peristaltic pump comprising:  
2 occluding surfaces;  
3 an occlusion facing the occluding surfaces; and

4                   a drive system configured to rotate the occluding surfaces in a first  
5                   direction so as to move at least one of the occluding surfaces and the occlusion  
6                   from a non-pumping position towards a pumping position and configured to  
7                   rotate the occluding surfaces in a second opposite direction so as to move at  
8                   least one of the occluding surfaces and the occlusion from the non-pumping  
9                   position towards the pumping position.

1           40.   A peristaltic pump comprising:  
2                   a pumping tube;  
3                   occluding surfaces rotatably coupled to a support for rotation about  
4                   a common axis on a first side of the pumping tube;  
5                   an occlusion on a second opposite side of the pumping tube;  
6                   a drive system coupled to the movable occluding surfaces and  
7                   configured to rotate the occluding surfaces relative to the pumping tube; and  
8                   a mechanical linkage coupled between the drive system and at  
9                   least one of the support and the occlusion, wherein the mechanical linkage is  
10                  configured and arranged to move at least one of the support and the occlusion  
11                  towards and away from one another towards at least one of a tube compressing  
12                  state in which the tube is compressed between the occluding surfaces and the  
13                  occlusion surface and a tube uncompressed state upon rotation of the occluding  
14                  surfaces relative to the pumping tube.